IN THE DRAWINGS

The objections to figures 3 and 4 by the Examiner are noted. In particular, the Examiner asserts that figures 3 and 4 fail to show a means for Chase combining and/or IR combining described in the specification. Applicants respectfully disagree.

As one of ordinary skill in the art would appreciate, a conventional Chase combining protocol and a conventional incremental redundancy (IR) protocol is intended. That is, the encoder/modulator blocks 220 and 325 provide Chase/IR combining means in a typical HARQ technique usually employed in this type of architecture. Details of such two known types of HARQ techniques including a Chase combining protocol and IR protocol are provided in the background section of the Applicants' Specification on page 3, lines 1-19. Accordingly, the conventional operation for HARQ is intended for multiple error coded streams. In other words, the Applicants believe that the description of known HARQ techniques and their use is readily known. For brevity, Chase combining and/or IR combining are inherently shown in figures 3 and 4 in blocks 220 and 325, respectfully. Therefore, Applicants respectfully submit that a separate depiction of means for Chase combining and/or IR combining is considered unnecessary in figure 3 and 4. Moreover, steps 160 and 170 in figure 2 depict this feature as addressed in the Applicant's specification in paragraph 2 on page 12. In this manner, the Examiner is respectfully requested to reconsider the objections to drawings including figures 3 and 4.

REMARKS

Claims 1, 3-21 are pending in the present application. By this amendment, claims 18-21 are amended without adding any new subject matter. In the Office Action, the Examiner objected to claims 18-20. Applicants respectfully request that the Examiner's objections to claims 18-21 be withdrawn.

The Examiner rejected claims 3-9 and 14-21 under 35 U.S.C. §112, paragraph one. The Examiner states that "evidence of concealment of the best mode is based upon a lack of disclosure dealing how Chase decoding and IR decoding can be combined in a single embodiment." Applicants respectfully disagree.

With regard to claim 3, the method is used for forming at least two error control coded streams wherein the streams comprise at least one of a Chase packet and/or at least one of an incremental redundancy sub-packet. As described in the Specification, on page 10, lines 1-10, both Chase packet and IR sub-packet protocols may be used for multiple error coded streams. That is, each of the error coded streams "(*e.g.*, Chase packet) and/or IR sub-packet(s)) may be received by one or more antennas of the multiple antenna system, depending on the scheme employed." Thus, as set forth in claim 3, the present method is described in a single embodiment. Therefore, Applicants respectfully submit that claims 3-9 and 14-21 are supported by the Applicants' Specification.

In particular, the M. P. E. P. states that the description be "concise." That is, obvious or minor details need not be explained while the disclosure must be sufficient, it must not all be encompassing. In other words, the Specification need describe the invention only in such detail

as to enable a person skilled in the most relevant art to make and use it. Accordingly, Applicants respectfully request that the Examiner's rejections of claims 3-9 and 14-21 under 35 U.S.C. §112, paragraph one, be withdrawn.

The Examiner rejected claims 3-9 and 14-21 under 35 U.S.C. §112(2) as being indefinite. The Examiner alleges that Chase and IR alternatives are not viewed as functional equivalents and thus, should be claimed separately. Applicants respectfully disagree. As stated above, both the Chase packet protocol and the IR sub-packet protocol are examples of a hybrid automatic repeat request (HARQ) technique used for re-transmitting the information. HARQ is a method used in a system for confirming that the information transmitted has been received without any errors. A channel coding scheme along with a re-transmission format is typically used. Channel coding schemes employed with the HARQ technique utilize redundancy in the transmitted information for greater reliability. One example of such an HARQ formatted stream is an error coded stream. As described in the Specification, on page 8, lines 1-7, one representative protocol of the HARQ technique involves forming Chase packets from each bit stream, while another protocol involves forming IR sub-packets from each bit stream. Thus, as set forth in claim 3, the present method allows alternatives for processing a bit stream. Therefore, Applicants respectfully submit that claims 3-9 and 14-21 are clear and request that the Examiner's rejections of claims 3-9 and 14-21 under 35 U.S.C. §112(2) be withdrawn.

With regard to claims 15, 16 and 21, the Examiner alleges that CRC checking on a combined packet apparently contradicts the "independent error detection" required by claim 10. Applicants respectfully disagree with Examiner's assertion. Embodiment shown in figure 3 indicates that one or more of the failed Chase packet(s) may be combined with the next received

Chase packet(s) (50) as is explained in the specification on page 11, lines 25-26. Likewise, the failed IR sub-packet(s) may be stored and combined with the next received IR sub-packet(s) (60), as set forth on page 12, lines 1-2 in the Applicants' Specification. For example, as to one embodiment of the present invention, as shown in Figure 3, the specification discloses that, a multiplexing step creates a block of data for error detection, such as a cyclic redundancy check; see Applicants' Specification, page 11, lines 9-10. In contrast with the first embodiment of figure 3, in the second embodiment of figure 4, each of the error decoded bit streams is independently detected for errors using cyclic redundancy checking. That is, CRC checking may be performed separately on each of the error coded streams. See Applicants' Specification, page 12, lines 4-11. Therefore, Applicants assert that one skilled in the art would not find the claimed subject matter to be indefinite. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claims 3-4 and 14-21 under U.S.C. §112(2).

Claim 1 stands rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent Application Publication No. 2002/0027956 to Lee et al. (hereafter ***Lee***). Applicants respectfully traverse the Examiner's § 102 rejections. An anticipating reference, by definition, must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. Claim 1, among other things, calls for a method of processing a block of information comprising forming separately at least two error control coded streams from the block of information. Based on the above-indicated legal standard, it is respectfully submitted that the ***Lee*** reference fails to anticipate claim 1. Thus, claim 1 and claims dependent therefrom are in condition for allowance which is respectfully requested of the Examiner.

With regard to independent claim 1, Applicants describe and claim, among other things, forming separately at least two error control coded streams. As shown in Figure 3, for each error coded stream, 225_1 through 225_p, Chase packet(s) or IR sub-packet(s) may be created from a corresponding channel coded and modulated stream of bits. For example, each of the error coded stream, 225_1 through 225_p, may be MIMO encoded by the MIMO encoder 227, and transmitted through a number of antennas, 230_1 through 230_m, associated with a multiple antenna system. See, Applicants' Specification, on page 13, lines 17-23. Likewise, the error coded stream 330_1 through 330_p shown in Figure 4 may be formed and MIMO encoded and transmitted through a number of antennas, 335_1 through 335_m, associated with a multiple antenna system. See, Applicants' Specification, on page 14, lines 22-27.

In other words, two or more bit streams may be error coded (*e.g.*, per-stream encoded), thereby allowing each to be transmitted and/or received by at least one antenna of a multiple antenna system. Protocols such as Chase and IR may work in conjunction with the channel coding and modulation to improve the reliability. Each of the at least two error coded streams may then be transmitted in response to a confirmation message. By selectively and independently using different re-transmitting techniques across multiple HARQ formatted streams of bits, multiple error control coded streams of packet(s) or sub-packet(s) may be simultaneously created and transmitted. This may increase the throughput in a wireless communication system that may employ multiple antenna system. See, Applicants' Specification, on page 4, line 18 – page 5, line 3.

The Examiner relies upon the ***Lee*** reference to teach the above set-forth features of independent claim 1. The Applicants respectfully submit that ***Lee*** fails to teach one or more features set forth above in claim 1. Accordingly, the Applicants disagree with the Examiner's

rejection.

The Examiner alleges that ***Lee*** discloses a wireless data transmission arrangement including transmitter circuitry (FIG. 6) comprising a pair of turbo code encoders (504, 512) for "forming separately at least two error control coded streams" from a "block of information". Separate antennas (path 1, path 2) are used by ***Lee's*** transmitter to transmit the respective "error control coded streams". The Examiner further alleges that ***Lee's*** data transmission arrangement further uses an ARQ protocol, and therefore transmits this data in response to a "confirmation message" of the ARQ protocol.

Lee is directed to encoding an information bit sequence into a plurality of encoded bit sequences differently for transmitting a signal in a communication system. ***Lee*** forms plurality of encoded bit sequences. See ***Lee***, paragraph [0045] on page 3. In ***Lee***, the same information bit sequence is encoded in a different output order to provide differently encoded bit sequences that may be transmitted either with transmit diversity, or alternatively, using a single H-ARQ method. See ***Lee***, Abstract. This H-ARQ method transmits a different signal for the "Retransmit" signal that has different parity bits from the "New" signal and combines the differently encoded bit sequences at the receiver. See ***Lee***, paragraphs [0059] – [0061] on page 4.

Lee does not separately form multiple error control coded streams. Instead, encodes the same information bit sequence into a plurality of encoded bit sequences differently. As understood, ***Lee*** fails to teach or suggest separately formed multiple error control coded streams. Rather, use of a single H-ARQ method is taught for a plurality of encoded bit sequences differently. Therefore, ***Lee*** is completely silent with regard to forming separately at least two error control coded streams. To the contrary, ***Lee*** teaches that one H-ARQ method may be used

for all the differently encoded bit sequences when transmit diversity is not used.

In the Office Action on page 7, the Examiner states that "[t]he examiner does not agree with applicant that "forming separately at least two error control coded streams" requires separate error control code encoders, as 'forming" may refer directly to "streams". If applicant's arguments require two encoders, then applicant's claims should require the same. Applicants respectfully disagree with the Examiner's reasoning. Pursuant to M. P. E. P. rules, so long as the language used defines the invention with a reasonable degree of particularity and distinctness, a claim may in general, be drawn as broadly as the prior art will allow. See M. P. E. P. § 706.03(d). It is also well settled that a choice of wording is not a basis for objection and rejection as long as it is definite and not inconsistent with accepted terminology in the art. If patentable novelty is disclosed and it is apparent that the claims are directed to such patentable subject matter, some latitude in the manner of expression and the aptness of terms is permitted even though the claim language is not as precise as the Examiner might desire. See M. P. E. P. § 706.03(d).

For at least the aforementioned reasons, Applicants respectfully submit that the present invention is not anticipated by ***Lee*** and request that the Examiner's rejection of claim 1 under 35 U.S.C. §102(e) be withdrawn.

Claims 1 and 3-9 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent Application Pub. No. 2003/0072285 to Onggosanusi et al. (hereafter ***Onggosanusi***). Applicants respectfully traverse this rejection. Applicants respectfully submit that these are rejections that have been already addressed by the Applicants in the Amendment,

which was filed on April 28, 2005. Recalling claim 1, at least two separately formed error control coded streams are independently transmitted in response to a confirmation message. However, ***Onggosanusi*** is silent with regard to separately forming at least two error control coded streams from the processed block of information and independently transmitting each of the at least two error control coded streams by a single corresponding antenna of a multiple antenna system.

The Examiner asserts that ***Onggosanusi*** discloses a MIMO hybrid-ARQ system with Chase packet error correction decoding or Incremental Redundancy sub-packet error correction decoding. ***Onggosanusi*** shows (FIG. 1) transmitter circuitry including a plurality of transmission antennas (1, 2, . . ., p) for transmitting a plurality of "streams" as the next block "sub-packet" or "packet" in response to a "confirmation message" (ACK) of preceding block. Spreading units (108) form transmission streams separately and the transmission streams so formed are "error control coded" streams, so it can be said that ***Onggosanusi*** shows "forming separately at least two error control coded streams from the block of information."

Rather, ***Onggosanusi*** describes a method in which data in a frame is first encoded, interleaved, modulated and then split into P sub-streams. *See*, the paragraph [0014] on page 1 in the ***Onggosanusi*** reference. A sub-stream by definition is an integral part of a whole or a main stream. The sub-stream may have a certain length from a starting position to an arbitrary ending position within the whole or main stream. Instead of forming separately at least two error control coded streams for independent transmission from a block of information, ***Onggosanusi*** discloses a hybrid HARQ technique based on a basis hopping concept in which P sub-streams are demodulated, merged into a single stream, and decoded to construct frame m. Therefore,

Onggosanusi teaches away from separately forming an error control coded stream, let alone separately forming at least two error control coded streams from the processed block of information for independent transmission thereof by a respective antenna of a multiple antenna system. Thus, claim 1 is in condition for allowance which is respectfully requested of the Examiner.

Regarding clam 9, the Examiner notes that the system disclosed by ***Onggosanusi*** can be considered a "one-to-many" communication system" as a single base station typically communicates with several mobile units. None of the cited references, considered either alone on or in combination, teach or suggest all of the claimed features of independent claim 1. Therefore, claims 3-9 depending therefrom are also in condition for allowance, which is respectfully requested of the Examiner.

Claims 1, 3, 4, and 7-9 were rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,771,705 to Kenney et al. (hereafter ***Kenney***). The Examiner's rejections are respectfully traversed. Accordingly, reconsideration of the §102 rejection of claims 1, 3, 4, and 7-9 is requested.

Unlike forming separately at least two error coded streams from a processed block of information, as claimed in amended claim 1, ***Kenney*** generates two copies of the same parity data for the systematic data and the interleaved systematic data to create different parity data subsets which may be utilized in independent combinations across two channels for transmissions via different antenna processors for successful reception of the systematic data. The generated parity information for the systematic data is then passed to demultiplexer and puncture unit 202 to be duplicated. See ***Kenney,*** col. 4, lines 21-23. The generated parity

information for the interleaved systematic data is then passed to a demultiplexer and puncture unit 205 to be duplicated. See ***Kenney,*** col. 4, lines 36-38.

The Examiner alleges that ***Kenney*** discloses a wireless data transmission arrangement including transmitter circuitry (FIG. 2) comprising a pair of turbo code component encoders (201, 204) for "forming separately a least two error control coded streams" from a block of information." The Examiner states that separate antennas (113, 114) are used by ***Kenney's*** transmitter to transmit the respective "error control coded streams." The Examiner concludes that ***Kenney's*** data transmission arrangement further uses a hybrid ARQ protocol with incremental redundancy (col. 7, lines 26+), and therefore transmits this data in response to a "confirmation message" or the ARQ protocol.

Instead, by creating different parity data subsets which may be utilized in independent combinations for successful reception of the systematic data, ***Kenney*** combines, with the systematic data, only a selected subset of parity data generated from the non-interleaved systematic data by encoder 201 and a selected subset of parity data generated from the interleaved systematic data by encoder 204 for transmission on a given channel within the transmitter diversity wireless communications system. In the embodiment shown in FIG. 2, parity data subset 1 (generated from the non-interleaved systematic data) and parity data subset 3 (generated from the interleaved systematic data) are concatenated, together with the non-interleaved systematic data, by multiplexer 206 for transmission over one channel (i.e., via antenna 113). See ***Kenney,*** col. 4, lines 45-47 and lines 63-68. Accordingly, the ***Kenney*** reference fails to anticipate the claim limitations of claim 1 and other rejected claims. Thus, claims 1, 3, 4, and 7-9 are in condition for allowance.

Claims 10-21 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,909,758 to Ramesh et al. (hereafter ***Ramesh***). Applicants respectfully disagree with the Examiner's rejection.

Claim 10 calls for a method of processing received error control coded streams that are formed separately. The method comprises performing independent error detection of at least two of the received error control coded streams in a multiple antenna system, wherein at least one confirmation message is transmitted in response to the performed independent error detection. ***Ramesh*** does not describe independent error detection of the separately or independently formed error coded streams received in a multiple antenna system, as disclosed in the Applicant's specification, so the ***Ramesh*** reference fails to anticipate claim 10 limitations. To the contrary, ***Ramesh*** teaches a way for decoding data blocks to enable a receiving device to decode a retransmitted data block using previously stored bits.

The Examiner alleges ***Ramesh*** discloses a wireless data transmission arrangement of a "multiple antenna system" including a transmitter that separately forms two error control coded streams (col. 7, lines 11+) and a receiver that "performs independent error detection of at least two of the received error control coded streams," using a CRC decoding (col. 8, lines 24+) and returns a negative "confirmation message" (NACK) to the transmitter when decoding is not successful.

Rather than forming separately at least two error coded streams from a processed block of information, as claimed in amended claim 10, ***Ramesh*** performs puncturing operations on two different copies of the data block. See ***Ramesh***, col. 7, lines 11-12. A puncturing is conventionally performed on an encoded bit sequence so that the resulting coding rate can be

matched with the required coding rate. In other words, the ***Ramesh*** reference appears to be completely silent with respect to performing independent error detection of at least two of the received error control coded streams. For at least this reason alone, the Examiner is respectfully requested to reconsider the rejection of claims 10-21 over the ***Ramesh*** reference.

Consequently, Applicants respectfully request immediate reconsideration and allowance of their pending claims in the present application. Applicants also believe that a full and complete response has been made to the Office Action. The Examiner is respectfully requested to consider all the pending claims.

In view of the foregoing, Applicants respectfully submit that all pending claims are in condition for allowance. The Examiner is invited to contact the undersigned at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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